

IFW
AF# 2877
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

In re. Patent Application of

Atty Dkt. 540-180

O'BRIEN et al

C# M#

Serial No. 09/466,899

TC/A.U.: 2877

Filed: December 20, 1999

Examiner: P. Natividad

Date: April 26, 2004

Title: SURFACE TOPOLOGY INSPECTION

Mail Stop Appeal Brief - Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

☐ **Correspondence Address Indication Form Attached.**

☐ **NOTICE OF APPEAL**

Applicant hereby **appeals** to the Board of Patent Appeals and Interferences from the last decision of the Examiner. (\$ 330.00)

\$

☒ An appeal **BRIEF** is attached in triplicate in the pending appeal of the above-identified application (\$ 330.00)

\$ 330.00

☐ Credit for fees paid in prior appeal without decision on merits

-\$ ()

☐ A reply brief is attached in triplicate under Rule 193(b)

(no fee)

☐ Petition is hereby made to extend the current due date so as to cover the filing date of this paper and attachment(s) (\$110.00/1 month; \$420.00/2 months; \$950.00/3 months; \$1480.00/4 months)

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☐ Applicant claims "Small entity" status, enter 1/2 of subtotal and subtract

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Any future submission requiring an extension of time is hereby stated to include a petition for such time extension. The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our **Account No. 14-1140**. A duplicate copy of this sheet is attached.

1100 North Glebe Road, 8th Floor
Arlington, Virginia 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100
SCS:kmm

NIXON & VANDERHYE P.C.
By Atty: Stanley C. Spooner, Reg. No. 27,893

Signature: _____



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APPEAL BRIEF

On Appeal From Group Art Unit 2877

Stanley C. Spooner
NIXON & VANDERHYE P.C.
8th Floor, 1100 North Glebe Road
Arlington, Virginia 22201-4714
(703) 816-4028
Attorney for Appellant

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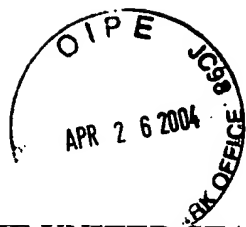
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APPEAL BRIEF

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I. REAL PARTY IN INTEREST

The real party in interest in the above-identified appeal is AIRBUS UK LIMITED in view of an Assignment of rights from BAE SYSTEMS, plc recorded May 14, 2002 at Reel 12936, Frame 314, a name change from British Aerospace Public Limited Company to BAE SYSTEMS, plc recorded October 12, 2000 at Reel 11195, Frame 065 and an Assignment from the inventors to British Aerospace Public Limited Company recorded March 9, 2000 at Reel 10616, Frame 423.

II. RELATED APPEALS AND INTERFERENCES

There are believed to be no related appeals or interferences with respect to the present application and appeal.

III. STATUS OF CLAIMS

Claims 1-19 stand rejected in the outstanding Final Rejection. The Examiner contends that claims 11-19 are indefinite under the provisions of 35 USC §112 and that claims 1-10 are unpatentable over claim 1 of U.S. Patent 5,619,327.

IV. STATUS OF AMENDMENTS

No further response has been submitted with respect to the Final Official Action in this application.

V. SUMMARY OF THE INVENTION

The present invention relates to the inspection of surface topology of materials, and particularly the surfaces of structural members subject to high stresses.

As is known from the inventors' own prior art, U.S. Patent 5,619,327 issued April 8, 1997 based upon a UK application filed March 19, 1994, it was known that metal components could be tested for cold compression of the metal.

In order to prevent crack propagation and thus fatigue failure of a component, the surface of that material could be placed under local compression so as to inhibit crack formation. While this concept was well known even in the 1950's (shot peening of connecting rods so as to reduce crack propagation and connecting rod failure in high RPM internal combustion engines), there had not been a process for evaluating the amount of cold compression of the metal.

The inventors' prior patent teaches a method of testing the metal component so as to provide a rough evaluation of cold compression. Essentially, the '327 patent teaches the provision of a Moiré grid some distance from the surface to be inspected. A light is directed through the grid to strike the surface at an oblique angle and then the surface is viewed through the same grid, but in a direction substantially normal to the surface in order to view interference fringes and regions of distortion of such fringes caused by stress applied to the surface.

However, as discussed in the background of appellants' present invention, there is a very fine balance between causing damage to the surface of the structural member because of over-compression and providing insufficient fatigue protection by under-compression of the member. In order to evaluate and determine the proper balance between over and under compression of the structural member, it is important to be able to ascertain not only the presence or absence of distortion of the surface of the structural member, but also to evaluate the degree of such distortion (to ascertain whether it is more than the minimal amount to provide

desired fatigue protection and yet less than the amount which will cause damage to the structural member itself).

It is noted that the '327 patent which is based on a UK application filed on March 19 of 1994 is approximately 4-1/2 years earlier than the UK prior date of the present application. During that approximately 4-1/2 years, the present appellants have endeavored to provide some method and/or apparatus to determine the degree of such structural deformation so as to be able to quantify whether there is sufficient deformation to inhibit fatigue failure while at the same time confirm that the structural member has not undergone so much deformation as to cause structural failure.

The present appellants found that if one provided a range of calibration samples subjected to differing stresses, both acceptable and unacceptable, and then if the surface of the region of distortion is measured and compared to the calibration samples, an accurate measurement of the degree of deformation can be determined. Thus, for the first time, the deformation of the surface of a structural member can be quantified to determine whether there has been insufficient structural deformation to prevent fatigue failure, the correct amount of structural deformation or an overabundance of structural deformation leading to a potential weakening and/or structural failure of the structural member.

Appellants' present invention, in addition to including the steps listed in the '327 patent, i.e., "supporting a moiré grid," "directing a source of light through the

grid” and “viewing the surface through the grid,” appellants found that the additional steps of **“measuring the extent of a said region of distortion and comparing the said measurement with equivalent measurements taken for respective calibration samples”** allows the degree of stress actually applied to the structural member to be determined.

VI. ISSUES

Whether claims 11-19 are indefinite under 35 USC §112 (second paragraph).

Whether claims 11-19 are non-statutory subject matter under 35 USC §101.

Whether claims 1-10 are obvious under the judicially created doctrine of obviousness-type double patenting over claim 1 of U.S. Patent 5,619,327.

VII. GROUPING OF CLAIMS

The rejected claims stand or fall based upon independent claims 1 and 11 as described in the argument portion of this Appeal Brief.

VIII. ARGUMENT

1. Discussion of the References

O'Brien (U.S. patent 5,619,327) is the only reference applied in the outstanding Official Action, and this reference comprises appellants' own prior art patent. Appellants also note that the O'Brien reference is assigned to the assignee

of the present invention in view of the Assignment from British Aerospace Public Limited Company recorded October 12, 2000, at Reel 11195, Frame 065.

As discussed above, the O'Brien '327 patent teaches and claims the three steps of testing a metal component for cold compression of the metal, i.e., "supporting a Moire grid," "directing a source of light through the grid" and "viewing the surface through the grid in a direction substantially normal to the surface" in order to view interference fringes and regions of distortion of the fringes. These three method steps can clearly be seen in independent claim 1 of the '327 patent, as well as in the detailed discussion of the invention.

The O'Brien '327 patent contains no teaching of any method of measuring or quantifying the amount of surface distortion, let alone any specific step of measuring the existing distortion and comparing it with equivalent measurements of calibration samples in order to determine the actual degree of stress applied to the structural member. In a Request for Reconsideration filed April 3, 2003, appellants specifically requested the Examiner to indicate how or where either the "providing a range of calibration samples" step or the "measuring the extent of said region of distortion and comparing the said measurement with equivalent measurements" steps were disclosed or rendered obvious in the '327 patent ("the Examiner is respectfully requested to point out where he believes that either of these method steps are disclosed or rendered obvious in the '327 patent." Request for Reconsideration page 3, last three lines). The Final Rejection mailed

September 25, 2003 (Paper No. 10) contains no explanation of where these claimed method steps are disclosed or rendered obvious in the O'Brien '327 patent.

2. Discussion of the Rejections

Claims 11-19 stand rejected under 35 USC §112 as allegedly being indefinite. The Examiner suggests that the claim does not “point out and distinctly claim the subject matter with applicant regards as the invention.”

To the extent it is understood, the Examiner also apparently believes that claims 11-19 are rejected under 35 USC §101 as being directed to non-statutory subject matter. It would be appear that with respect to both of the above bases for rejection, the rejection is only with respect to claim 11, and claims 12-19 are rejected only because they depend from claim 11. However, clarification is specifically requested with respect to claims 11-19.

Claims 1-10 stand rejected under the “judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent 5,619,327.” The Examiner specifically identifies “claims 1-2 and 3-10” but does not indicate how or why he divides claims 1-10 up into two separate groups. Appellants’ understanding and assumption is that the Examiner believes that claim 1 of the present application is an obvious variation of claim 1 in the O'Brien '327 patent and that claims 2-10 are rejected based upon their dependency from

claim 1. However, clarification and confirmation of this understanding is respectfully requested.

3. The Errors in the Final Rejection

There are at least three significant errors in the Final Rejection and they are summarized as follows:

- (a) The Examiner misapprehends 35 USC §112 and the bases upon which rejections thereunder are supported;
- (b) The Examiner also misinterprets claim 11 as a combination claim;
and
- (c) The Examiner has not met his burden of establishing obviousness of the presently claimed invention over the O'Brien '327 patent.

(a) The Examiner misapprehends 35 USC §112 and the bases upon which rejections thereunder are supported

The Examiner's allegation that claims 11-19 are somehow indefinite under the provisions of 35 USC §112 has simply not been supported. The Examiner made this exact same rejection (verbatim) in the first Official Action mailed October 3, 2002 (Paper No. 7), to which appellants responded in the Request for Reconsideration dated April 3, 2003.

Appellants pointed out that the Board of Patent Appeals and Interferences has previously held that an apparatus claim may include a reference to a method without making that claim indefinite. Appellants cited the case of *Ex parte Porter*,

25 USPQ2d 1144 (BOPAI 1992) which is a more recent case than the Examiner's cited *Ex parte Lyell*, 17 USPQ2d 1548 (BOPAI 1990).

Appellants also direct the Examiner's attention to the Manual of Patent Examining Procedure (MPEP) Section 2173.05(f) which indicates that a "reference to a preceding claim to define a limitation is an acceptable claim construction which should not necessarily be rejected as improper or confusing under 35 USC §112 (second paragraph)." The MPEP provides the specific example as "not indefinite under 35 USC §112 (second paragraph)." Thus, in appellants' claim 11, it recites only an apparatus.

In the preamble, it indicates that the apparatus is for carrying out the method of claim 1 and then recites the structural elements and interrelationship of that apparatus. Firstly, the reference to claim 1 in the preamble could not have any effect of rendering indefinite the elements recited in the claim. Secondly, it merely indicates the purpose to which the apparatus is directed, i.e., carrying out the method of claim 1.

Additionally, the Examiner misinterprets the *Ex parte Lyell* case and the appropriate MPEP section which references this case. The prohibition of *Ex parte Lyell* and MPEP Section 2173.05(p) is against a "single claim which claims **both** an apparatus and the method steps of using the apparatus" (emphasis added).

Appellants do not claim any method steps in independent claim 1. Independent claim 1 is directed solely to the four structural elements recited in the claim and

their structural interrelationship. The purpose of the apparatus is disclosed in the reference to the method of claim 1. However, the claim itself does not claim any method steps. As a result, claim 11 clearly does not run afoul of the prohibitions of §112 as interpreted in the *Ex parte Lyell* case and as discussed in MPEP Section 2173.05(p).

Appellants' independent claim 11 and claims dependent thereon are clearly definite, as they merely reference the method of claim 1 as a shortcut description of the purpose of the apparatus recited in claim 11, i.e., to perform the method of claim 1. Again, the Examiner's suggestion that this apparatus claim is somehow indefinite misapplies the *Ex parte Lyell* decision and ignores the specific statements of the Board of Patent Appeals and Interferences in the *Ex parte Porter* case.

There is simply no basis for a rejection of claim 11 or claims 12-19 under 35 USC §112 (second paragraph) as being indefinite, because there is a reference to the method of claim 1 contained in the preamble of this apparatus claim.

(b) The Examiner also misinterprets claim 11 as a combination claim

The Examiner also states that "additionally, under 35 U.S.C. 101 as the claimed invention is directed to non-statutory subject matter." How or why the Examiner believes claim 11 is directed to non-statutory subject matter is not understood. To the extent the Examiner somehow believes that claim 11 includes

method steps and apparatus elements in the same claim, he is believed mistaken, and the above comments with respect to Examiner error (a) above are herein incorporated by reference.

While the above discussion with respect to the *Ex parte Lyell* and *Ex parte Porter* cases believes that these two cases are entirely compatible (claim 11 does not recite both method steps and apparatus limitations in the same claim – it merely recites apparatus elements which are combined to perform the purpose of the invention, i.e., the method of claim 1). However, to the extent that these two decisions of the Board of Patent Appeals and Interferences are inconsistent, the later case, *Ex parte Porter*, would appear to control. How or why the Examiner believes that *Ex parte Porter* is not on point with regard to the subject matter of claim 11 is not seen from the Final Rejection (or its predecessor) and clarification is again respectfully requested.

Finally, it is noted that the above aspects of the *Ex parte Porter* case were brought to the Examiner's attention on pages 2 and 3 of the Request for Reconsideration dated April 3, 2003, and yet the Examiner's Final Rejection mailed September 25, 2003 appears to be a verbatim copy of the previous Official Action and does not appear to address the issues raised in appellants' Request for Reconsideration. (While it is noted that there is a "Response to Arguments," this response ignores the MPEP discussion of *Ex parte Lyell* and *Ex parte Porter* and

does not provide any explanation of the basis for the Examiner's believed misinterpretation of these sections).

(c) **The Examiner has not met his burden of establishing obviousness of the presently claimed invention over the O'Brien '327 patent**

The Examiner rejects claims 1-2 and 3-10 as being unpatentable under the "judicially created doctrine of obviousness-type double patenting." As noted above, appellants have respectfully requested clarification as to why the Examiner divides claims 1-10 up into two groups and how this affects or impacts the alleged obviousness-type double patenting, and further clarification is requested.

The Examiner's admission that "the conflicting claims are not identical" is appreciated. However, the Examiner contends they are not patentably distinct from each other "because it is **notoriously well known** that any measurement may be calibrated with known samples of known values" (emphasis added). While the Examiner suggests that this is well known, appellants' Request for Reconsideration filed April 3, 2003 specifically requested the Examiner to point out where or how the O'Brien '327 patent discloses either or both of the additional method steps recited in existing claim 1, i.e., the "providing a range of calibration samples" step and/or the "measuring the extent . . . and comparing . . ." steps. Thus, appellants, in the previously filed Request for Reconsideration, raised the issue that the Examiner's allegation of "notoriously well known" steps was

traversed, and yet the Examiner did not supply any further evidence to support his contention.

Appellants reference the Examiner to the MPEP Section 2144.03 which states that "if the applicant traverses such an assertion, the examiner should cite a reference in support of his or her position." Even though this issue was raised prior to the submission of the Final Rejection, the Examiner has thusfar failed to provide any reference or other information tending to support his contention.

Moreover, as noted above, the presently claimed invention, including the non-obvious method steps, was invented more than 4-1/2 years after the invention of the original O'Brien '327 patent. The Examiner has not shown or provided any evidence to suggest why or how these additional method steps solves the problem of being able to establish "the degree of such cold expansion in order to guarantee the integrity of structural members such as those in modern aircraft structures" as discussed in appellants' background of the invention, page 2, the lack of the amount of time required to invent this improvement, is clear evidence that such an improvement would not be "notoriously well known" to anyone of ordinary skill in the art, or even to the inventor of the O'Brien '327 patent. As a result, the burden is on the Examiner to provide some teaching to support his contention that claims 1-10 are "notoriously well known" in view of the O'Brien '327 invention, and having failed to meet his burden of proof, this rejection also fails.

IX. CONCLUSION

The appealed-from Final Rejection merely incorporates verbatim the points set out in the first Official Action and clearly does not respond to the defects therein raised by appellants' Request for Reconsideration. The rejection under §112 is in direct opposition to the instructions of the MPEP Section 2173.05(f), which states that an apparatus claim referencing a method claim is not indefinite under 35 USC §112. The Examiner appears to have specifically interpreted claim 11 as a claim combining both method steps and apparatus limitations, which is not the case. The prohibition is against claims which recite **both** method steps and apparatus limitations. Claim 11 recites only an apparatus, and the only reference to a method is not to a method step or method steps, but rather the method of claim 1, i.e., the beneficial combination of method steps set out in claim 1, to provide guidance as to what the apparatus recited in claim 11 carries out, i.e., the method of claim 1.

Finally, appellants have previously pointed out that the Examiner has not provided any support for his "notoriously well known" contention, and thus the Examiner has failed to meet the requirements of the MPEP Section 2144.03 requiring such explanation. Moreover, the time difference between the filing of the O'Brien '327 application and the filing of the present application (4-1/2 years) clearly indicates that the currently claimed invention would not be obvious to one

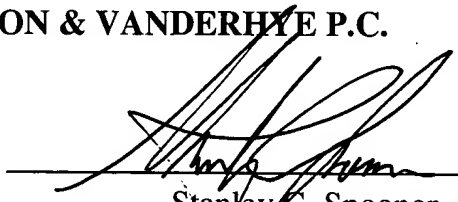
having an expert's skill in the art, i.e., we have the same inventor in both cases, let alone one of ordinary skill in the art at the time of the presently claimed invention.

Thus, and in view of the above, the rejections of claims 1-19 are clearly in error and reversal thereof by this Honorable Board is respectfully requested.

Respectfully submitted,

NIXON & VANDERHIE P.C.

By: _____


Stanley C. Spooner
Reg. No. 27,393

SCS:kmm
Enclosures
Appendix A - Claims on Appeal

APPENDIX A

Claims on Appeal

1. A method of inspecting the topology of a surface of a structural member to determine the degree to which a known type of stress has been applied to the member, the method including the steps of:

providing a range of calibration samples of structurally equivalent members, the samples each having been subject to the known type of stress to a differing respective degree;

supporting a Moire grid in a position spaced from and co-extending with the surface to be inspected and at a small included angle to the surface;

directing a source of light through the grid to strike the surface at an oblique angle thereto;

viewing the surface through the grid in a direction substantially normal to the surface to view interference fringes and regions of distortion to the fringes, and

measuring the extent of a said region of distortion and comparing the said measurement with equivalent measurements taken for respective calibration samples to determine the degree of stress applied to the member.

2. A method as in claim 1 in which the step of making the comparison between the said measurement and equivalent distances measured for calibration samples of a member of the same type, relevant dimensions and material, may include determining

which sample exhibits substantially the same measured distance as the said member, and noting the degree of stress applied to that sample, which degree of stress will substantially correspond to the stress applied to the said member.

3. A method as in claim 1 including the step of adjusting the small included angle to provide substantially the same fringe density as for the equivalent measurements taken on the calibration samples.

4. A method as in claim 1 including the step of providing a generally parallel said source of light.

5. A method as in claim 1 including the step of providing a substantially point source of said light.

6. A method as in claim 1 in which the step of measuring the extent of a said region of distortion comprises taking the greatest possible measurement across the said region substantially in line with the undistorted fringes, from commencement of distortion on one side of the region to ending of distortion on the other side thereof.

7. A method as in claim 1 in which, where the distortion to the surface comprises an annular region surrounding a hole in the surface, the step of measuring the extent of the region of distortion comprises taking the measurement substantially in line with the undistorted fringes from a periphery of a said hole to a point of fringe distortion farthest from the said periphery.

8. A method as in claim 1 including setting the said oblique angle substantially at one of 45 degrees and 63.2 degrees.

9. A method as in claim 1 including the step of taking a photographic image of the surface as viewed by the observer.

10. A method as in claim 9 including creating a digitized said photographic image, transferring the digitized image to a computer, image processing same and programming the computer to search for particular shapes of curve representing at least one of commencement and ending of regions of distortion of the fringes.

11. Apparatus for carrying out the method of claim 1 including a body supporting:
a Moire grid for placement in a position spaced from and co-extending with the surface to be inspected and at a small included angle to the surface;

a source of light directed through the grid to strike the surface at an oblique angle thereto;

a viewing aperture for viewing the surface through the grid, and
means for measuring the extent of a said region of distortion.

12. Apparatus as in claim 11 including a sighting device to enable the observer to determine whether the surface is being viewed substantially normal thereto.

13. Apparatus as in claim 12 in which the sighting device includes a mirror facing the observer, the mirror being fast with the body and having a line indicator spaced therefrom in the direction of the observer whereby when the observer views the surface

substantially normal thereto no reflection of the line indicator will be observable in the mirror.

14. Apparatus as in claim 11 in which the source of light comprises a light emitting diode.

15. Apparatus as in claim 11 including a high resolution, digital, still camera to photograph the surface.

16. Apparatus as in claim 15 including a computer programmed to process a digital image from the camera and search for particular shapes of curve representing at least one of commencement and ending of regions of distortion of the fringes.

17. Apparatus as in claim 11 in which the line spacings of the Moire grid are substantially in the range 1 to 200 lines per mm.

18. Apparatus as in claim 17 in which the said range is substantially 5 to 20 lines per mm.

19. Apparatus as in claim 18 in which the said line spacing is substantially 10 lines per mm.